Among numerous subjects which came up for consideration, it appeared that the scheme for publication, in a uniform manner, of actual observations and monthly results from a limited number of stations in each country, which are to be considered as international, had been already accepted almost without exception or suggestion of amendment by all the countries which had been present at Vienna. It is hoped that this measure will ultimately tend to bring about uniformity in hours and methods of observation.

In weather telegraphy it was resolved to calculate gradients in the metric scale, as millimetres per one degree (sixty nautical miles). In this country they will be referred to English units. It was not found practicable to endeavour to introduce uniform hours for observations in weather telegraphy in Europe at present. As to weather charts, a proposal for the exclusion of all meridians except that of Greenwich was postponed to the next Congress. It was resolved to take advantage of that meeting to attempt to effect the comparison of the principal standard barometers by means of travelling barometers to be conveyed to the place of meeting, and left there for a considerable time.

It was recognised as impracticable at present to create an International Meteorological Institute, and consequently it was decided that international investigations must be carried on at the expense of individual nations, other nations to be requested to furnish materials, as far as possible, in a usable form. A list of upwards of 200 subscribers to the international synoptic weather charts of Capt. Hoffmeyer was announced.

Resolutions were adopted in favour of the establishment of stations on high mountains, and in distant localities, and Lieut. Weyprecht's proposition for a circle of observing stations in the Arctic Regions round the Pole was recognised as scientifically of high importance and deserving of general support.

With reference to universal instructions for observations it was stated that no general form of instructions could be drawn up to suit all climates, and it appeared to the committee that the instructions recently prepared in the German, Russian, and English languages respectively, as well as in Italian (as soon as some contemplated modifications shall have been introduced), were sufficiently in accordance with the requirements of the Vienna Congress. It was hoped that ere long French instructions of the same tenor would be issued.

It was announced that the Italian Government was prepared to invite the next Congress to meet at Rome in September 1877, and the proposal was most gratefully accepted. In preparation for this meeting a number of reports on the present state of the different departments of the science are called for from various meteorologists. The questions to be treated in these reports are mainly instrumental, and they are of great importance in the present state of the subject. The detailed Report of the Committee will be published without delay.

SOIRÉE OF THE ROYAL MICROSCOPICAL SOCIETY

ON Friday, April 21st, Mr. H. C. Sorby, president of the Royal Microscopical Society, gave a large *soirée* in the apartments of King's College. Invitations had been issued for above 1,500, including the whole of the Fellows of the Royal Microscopical Society, the presidents and leading officers of many of the London Scientific Societies; all the distinguished foreigners now in London as commissioners from the various foreign Governments to the Exhibition of Scientific Apparatus at South Kensington; and many of the President's private friends. About 800 were present, including about 300 ladies. After having been received by the President and one of the secretaries, the visitors passed into the various rooms of the College, in which were exhibited many objects connected with microscopical science. For the number, variety, scientific value, or general interest of the specimens, this exhibition has probably never been surpassed. Amongst the new instruments may be mentioned Mr. Sorby's arrangement for accurately measuring the wave-length of the centre of absorption-bands in spectra; a new form of Stephenson's erecting binocular microscope, by Mr. Bevington, and another by Mr. Browning, of somewhat different construction. Mr. Browning also exhibited his new portable microscope, which is so constructed that the body can be turned on one side and reversed in such a manner as to reduce the height to about one half. The President also exhibited a large series of specimens illustrating his own special subjects, shown by means of fifty microscopes, lent to him by four of the principal makers in London (Becks, Browning, Crouch, and Ross), and about 150 first-rate instruments and objects were contributed by the Fellows of the society and other friends. These were so distributed over the large apartments of the College as to avoid crowding in any part. Almost every branch of science to which the microscope has been applied was well represented, and many of the finest specimens ever prepared were shown and described. Many very interesting living objects were sent direct from the Brighton Aquarium and elsewhere. In the lecture theatre were exhibited Dr. Hudson's most beautiful drawings of microscopic objects shown in a new manner as transparencies; Mr. Spottiswoode's splendid polarising apparatus, and various objects shown with the oxy-hydrogen microscope by How and Company. The large entrance hall was decorated with plants and flowers, and used as a promenade. The two museums of the College were also thrown open. Refreshments were supplied by the steward of the College. The guests were provided with a classified catalogue of the objects exhibited, but they were so numerous that it was impossible for any one to examine more than a small part of the whole. One of the most satisfactory results of the *soirée* is the great impression produced by it on the foreign scientific men, who appear to have been quite unprepared for, and greatly surprised at, what they saw during the evening.

ON CERTAIN METHODS OF CHEMICAL RESEARCH[1]

THE lecturer began by describing the simple form of apparatus which he employed many years ago in his researches on the heat evolved in the combination of oxygen, chlorine, bromine, &c., with other bodies. In every case the bodies to be combined were inclosed in a vessel surrounded with water, and the combination was effected either by the ignition of a fine platinum wire, or where they acted directly upon one another, by the fracture of a glass capsule containing one of the combining bodies, the heat being measured by the rise of temperature of the water. He next referred to the arrangement by which he had been the first to decompose water so as to render visible the hydrogen and oxygen, and to measure their relative volumes by means of atmospheric electricity and of electrical currents from the ordinary machine. For this purpose fine platinum wires were hermetically sealed into fine thermometer tubes, which were then filled with dilute sulphuric acid by withdrawing the air by ebullition. The same current of frictional electricity will decompose the water in almost an indefinite number such couples arranged in a consecutive series. Capillary tubes of this kind may be employed for eudiometric experiments, which would be exceedingly tedious in wide tubes. Thus oxygen gas can at once be absorbed by passing the silent discharge through it while standing

[1] Abstract of a Lecture to the Chemical Society by Dr. Andrews, F.R.S., April 28. Communicated by the author.

over a solution of iodide of potassium. By means of the air pump it is easy with a gentle exhaustion to expand the gas so that it may fill the whole tube while the open end is immersed in the liquid which it is desired to introduce; on removing the pressure the gas will be in contact with the new liquid.

The lecturer exhibited some of the original tubes with which Prof. Tait and he first determined that ozone is a condensed form of oxygen, and explained a form of apparatus by means of which this important fact can be exhibited as a class experiment. A full description of this apparatus will be found in his lecture on ozone, which was delivered some time ago before the Royal Society of Edinburgh, and has since been published by the Scottish Meteorological Society. With this apparatus the lecturer has been able to determine that chlorine gas undergoes no change of volume from the prolonged action of the electrical discharge. His experiments on this subject have not yet been published, but they were made under singularly favourable conditions for discovering a very small change of volume in the gas if any such change had occurred.

The lecturer in the next place briefly alluded to the method he formerly employed for determining the latent heat of vapours of which a detailed account was given in a former communication to the Chemical Society. The apparatus employed admits of exact experiments being made on a small scale, and consequently on substances in an absolutely pure state, an object of even greater importance in inquiries of this kind than in ordinary chemical analyses. He remarked that a large field for investigation in this part of the domain of science lay comparatively uncultivated and would yield a rich harvest of results to anyone who would enter upon it.

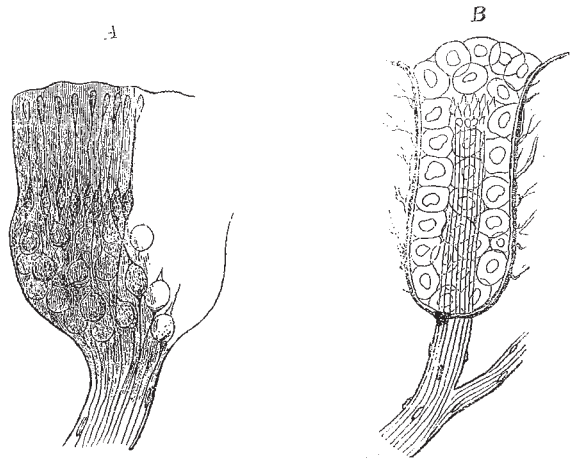
Passing from this subject, the lecturer described a dividing and calibrating machine which he contrived some years ago for the special work in which he has been engaged, and which has given to many of his investigations an accuracy otherwise hardly attainable. He has been enabled by means of it to construct thermometers whose readings are absolutely coincident throughout every part of the scale, and to calibrate with almost perfect accuracy the glass tubes used in his pressure experiments. It would be impossible in an abstract to describe the construction of this machine, but it may be important to mention that the screw which moves the microscope or divider is a short one of remarkable accuracy constructed by Troughton and Simms.

The last subject treated was the lecturer's method of investigating the properties of gaseous and liquid bodies at high pressures and under varied temperatures. By means of his apparatus, which was exhibited to the meeting, pressures of 500 atmospheres can be readily observed and measured in glass tubes—in a word, a complete mastery obtained over matter under conditions hitherto beyond the reach of direct observations. This has been effected by a novel mode of *packing* a fine steel screw, so that while entering a confined portion of water no leakage whatever occurs under enormous pressures, and also by a peculiar method of forming a tight junction between glass and metal. The lecture was concluded by a short statement of the more important results lately communicated to the Royal Society on the properties of matter in the gaseous state.

SCIENCE IN GERMANY

(From a German Correspondent.)

IN my last communication (NATURE, vol. xiii. p. 75), I noticed the researches of Ranke on various organs of sense of the lower animals. A new series of these researches having since appeared, I will give some account of them in what follows. Ranke (*Zeitschrift für Wissenschaftliche Zoologie*, xxv., 2 Heft. Supplement.) has studied more closely, in their physiological relations, the organ of hearing of certain grasshoppers (*Acridia*) and snails (*Pterotrachea*), and the eye of the leech, which organs were previously known in general from the researches of Siebold, Leuckart, Leydig, Boll, and others. The Acridia carry their organ of hearing on the base of the hindermost extremity. It consists essentially of a membrane, which is stretched within the body wall on a fixed ring, and an auditory nerve, which is connected from within to that membrane, and ends on it in a swelling or so-called ganglion. That membrane is undoubtedly to be compared with the membrane of the tympanum in the ear of the most highly organised animals; inasmuch as, like this, it is put in vibrations corresponding to the sound-waves in the air, and transfers these vibrations to the parts lying within. In the higher animals, these parts consist of rigid lever arrangements (small bones of the ear), which, however, are connected with the acoustic nerve not directly, but through a transmitting apparatus, which separates the vibrations produced by various sound-waves, and specially prepares them for conveyance by the nerves. In the Acridia, the whole internal conduction of the sound-waves is more simply arranged; the ganglion on the tympanic membrane consists of two different halves; in the interior the finest nerve-threads proceeding from the auditory nerve unite with large round nerve-cells, from



Ganglion of organ of hearing in Acridia (schema after Ranke).

Eye of leech (schema after Ranke).

which they proceed to the boundary of this half of the ganglion, and there end in smaller nerve-cells. The outer half of the ganglion consists of a brighter and delicate ground mass, in which very fine rods, transparent like glass, and fixed, run parallel towards the tympanic membrane; they spring out of those smaller cells, terminate on the tympanic membrane with longish thickenings, and may be regarded as the end-apparatus of the nerve-conduction. But while thus the vibrations of the tympanic membrane are communicated to the rods and from these direct, without further intervention, to the nerve-apparatus, there is not entirely wanting a weakening or damping arrangement for the sound-waves; for the ground-mass, in which the rods rest, may very well be regarded as such an arrangement. As the rods are all formed alike, the sensations of tone by the Acridia must be always homogeneous and simple; and if we may suppose that the organ of hearing of these animals is adapted to their own production of tone, by which they excite sexual desire, then their monotonous rattle agrees with the arrangement of the auditory apparatus for a simple sensation. In other grasshoppers, the Locustida, the vocal organ produces a sound compounded of more tones; and correspondingly, they have on their fore legs an organ of hearing, the rods in which are of various length and breadth, and, arranged like the wires in a